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Veröffentlichungsversion / Published Version
Arbeitspapier / working paper

Empfohlene Zitierung / Suggested Citation:

Amelina, A. (2012). *Hierarchies and Categorical Power in Cross-Border Science: Analyzing Scientists' Transnational Mobility between Ukraine and Germany*. (COMCAD Working Papers, 111). Bielefeld: Universität Bielefeld, Fak. für Soziologie, Centre on Migration, Citizenship and Development (COMCAD). <https://nbn-resolving.org/urn:nbn:de:0168-ssoar-51038-0>

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COMCAD Arbeitspapiere - Working Papers

General Editor: Thomas Faist

No.111, 2012

Amelina, Anna: Hierarchies and Categorical Power in Cross-Border Science: Analyzing Scientists' Transnational Mobility between Ukraine and Germany, Bielefeld: COMCAD, 2012
(General Editor: Thomas Faist; Working Papers – Center on Migration, Citizenship and Development; 111)

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Hierarchies and Categorical Power in Cross-Border Science: Analyzing Scientists' Transnational Mobility between Ukraine and Germany

The collapse of the socialist regimes in Eastern and Central Europe and the fall of the Iron Curtain at the end of the 1980s led to mass emigration from former socialist countries to Western Europe. During the 1990s and later, after the 2004 and 2007 enlargements of the European Union, emigration flows from Central and Eastern to Western Europe continuously decreased¹ and permanent emigration was gradually replaced by short-term and circular migration (Dietz 2007; Leon-Ledesma and Piracha 2001; Wallace 2002).

This article focuses on the changing nature of migration from Eastern to Western European countries to address two issues. First, it examines how cross-border mobility of scientists from Eastern European countries contributes to the formation of the transnational field of science. The second purpose is to identify the conditions which influence the unequal distribution of symbolic, organizational and material resources within this transnational field. These issues are closely connected and are discussed using the example of natural scientists' geographical mobility between Ukraine and Germany. The discussion is based primarily on the results of 12 semi-structured interviews the author conducted between 2010 and 2012 with natural scientists (mathematicians, physicists and biologists) who regularly travel between Eastern and Western Europe. The interviews were conducted in localities in Germany and Ukraine using methods inspired by multi-sited ethnography (Amelina 2010).

The focus on the Eastern European social and historical contexts² is promising for three reasons. First, immediately after the breakdown of the socialist regimes at the beginning of the 1990s, international geographical mobility was one of the main strategies for individuals and households to improve social mobility (Heyns 2005). Second, the transformation of the political and economic regimes of Eastern and Central European countries led to comprehensive modifications to their migration and welfare regimes (Koslowksi 1998; Cerami and Vanhysse 2009; Drahokoupil and Myant 2009). The welfare gaps which emerged served as an additional stratifying force within the 'class orders' of the sending

¹ In 2004 nine countries (Estonia, Latvia, Poland, the Czech Republic, Slovakia, Hungary, Slovenia, Malta and Cyprus) were invited to join the EU and in 2007 another two countries, Bulgaria and Romania, became members

² While the article does not aim to homogenize the social structures of Eastern European countries, it does take some commonalities in the processes of societal transformation in these countries as a starting point

countries. Moreover, in the second half of the 1990s researchers realized that migration from Eastern and Central European countries had a significant influence on the transformation of the migration and welfare regimes of some of the receiving countries in Western Europe (Banting 2000; Piperno 2007; Lutz 2008). Third, the enlargement of the European Union has not only produced new mobility and welfare regimes on the supra-national level, but has also created new peripheries of Europe which include countries such as Russia, Ukraine, Belarus and Moldova. Consequently, migrants from these new European peripheries who continuously move between the sending and receiving countries experience different forms of oppression and exploitation than migrants from Eastern and Central European EU member states (Jandl 2007; Wallace 2008).

This article addresses the question of how the changing nature of the current scientists' migration between the Eastern European periphery and Germany encourages the formation of unequal social positions within the social field of science. In particular, it goes beyond the study of scientists' geographical mobility as a process that influences an economic transformation of the sending country or of the receiving country. It does not discuss the conditions of social mobility of migrated scientists in the receiving country. Instead, it provides evidence of how social inequality – understood as a hierarchy in terms of access to symbolic, organizational and material resources – emerges within the transnational field of science to overcome the nation-state-centred focus (Faist 2000; Amelina and Faist 2012) and to explore inequality formation in the context of cross-border migration.

The article begins with a brief overview of the current state of research on the geographical mobility of highly skilled migrants and a discussion of the brain drain and brain circulation approaches. The concept of the transnational field of science is then introduced and its underlying premises are explained. The final section presents the preliminary results of the author's qualitative study, which show the significance of multi-dimensional hierarchies that are emerging in the field of cross-border science.

International Migration of Scientists: Neither Brain Drain nor Brain Circulation

One of the scientists interviewed during the empirical fieldwork between 2008 and 2011 was Oleg, a then 28-year-old mathematician who was employed as a junior professor at the

University of Wiesenbad³. The following is a brief professional biography which allows us to address the concerns of this article.

Oleg began his career at Kiev State University, where he studied Mathematics. He graduated at the age of 20. The supervisor of his diploma thesis, who held professorships at the Universities of Kiev and Wiesenbad, suggested to Oleg that he obtain his PhD at a German university. Oleg completed his doctoral studies at the age of 22 and won the prize for the best dissertation at the Department of Mathematics in Wiesenbad. Later, Oleg's PhD supervisor helped him to get a senior research position at the same university. Like his PhD supervisor, Oleg has been teaching at Kiev University on a regular basis, even though he is a full-time junior researcher. This is possible because academic terms at German and Ukrainian universities do not overlap, so that Oleg can spend several months teaching in Kiev.

In the interview Oleg expressed that he experienced high work pressure at the university of the receiving country. He said that to be accepted, an Eastern European scientist is expected to work "twice as hard" as a German colleague. However, he also stated that his research position at the German university not only gives him access to current research trends, financial (research) resources and Europe-wide collaboration opportunities; it also offers certain benefits at the university of the sending country, where he is given additional opportunities to participate in decision-making and re-structuring processes concerning the curricula.

The above brief account of one interviewee's scientific career is a good example of the changing, increasingly multi-directional nature of (Eastern European) scientists' migration. It also reflects the ambivalent social position of transnational scientists who experience some degree of exploitation at the university of the receiving country, but at the same time have opportunities to build a reputation as scientists, participate in decision-making and obtain research funds at the university of the sending country, not least because of their simultaneous commitment to two universities in the sending and receiving countries.

This raises two questions: Which theories can be applied to examine this kind of transnational scientific career from a social inequality perspective? Or, more generally: Which approaches address the relationship between the formation of unequal social positions and the cross-border migration of scientists?

Based on a review of the current state of research, two competing concepts have been selected which focus on the subject of scientists' international mobility: the concept of brain

³ The German university is given a fictitious name here to protect the identity of the interviewee.

drain and the concept of brain circulation. The following critical discussion of these concepts addresses questions such as: How do the two concepts define inequality: as social or as economic inequality, as inequality between nation-states or as inequality between individual or collective positions? Which conceptual tools are used in the two approaches to determine the role of cross-border migration in the formation of inequalities? Does migration increase or reduce (social) inequality?

The existing studies on migration from Eastern Europe in the early 1990s appear to sufficiently confirm the *brain drain approach* (Vizi 1993). They address emigration from countries such as Bulgaria, former Czechoslovakia, Poland, Hungary and Romania, as well as from Russia and other post-Soviet republics. Analysis of the available statistical data suggests that immediately after the fall of the Iron Curtain in 1990 and 1991 up to 20 per cent of emigrant populations from these countries were scientists from professional fields such as medicine, biology, chemistry, engineering, information technology, mathematics and physics. The studies regard the emigration of scientists as a loss of “intellectual resources”, which has a negative influence on the economic growth of the sending countries (Ivakhnyuk 2006). However, studies on structural factors also identify difficult economic conditions such as a lack of research funding, low salaries and “better research opportunities” abroad as the main factors that cause scientists to emigrate (Ibid.). The studies of scientists’ motivations for emigrating conducted immediately after the fall of the Iron Curtain showed that the limitations of a scientific career and the declining prestige of the scientific profession were among the major reasons for scientists to emigrate (Vizi 1992: 104). It is worth noting that these studies implicitly refer to the world systems theory, which originally framed the brain drain approach (Sassen 2001; Portes and Walton 1981).

The brain drain approach concerns the interrelation between scientists’ international migration and the formation of *economic* inequalities as a result of international division of labour (Ibid.). Focusing primarily on the economic development levels of states, it rarely takes the transformation of social positions of individuals or collectives into consideration. This is why it does not focus on how cross-border migration influences the scientists’ access to the symbolic, organizational and material *resources* within their professional field. The institutional transformation of science as a particular social field is rarely addressed in this regard.

However, current studies on the migration of highly skilled populations from Eastern European countries (e.g., Wallace 2002; Williams, Baláž and Wallace 2004; Morokvavic 2004) call the premises of the brain drain theory into question. The pessimistic notion of the exploitation of the periphery by the centre is replaced by an analysis of multi-directional migration as a resource for the economic development of the receiving and sending countries. Researchers use the term *brain circulation* (Baláž, Williams and Kollár 2004) to

reflect the fact that the elimination of geographical mobility constraints in Europe has led to unique migration conditions which promote temporary rather than permanent migration (Wallace and Stola 2001). In addition, these studies predict a convergence of economic development of the new and the old EU member countries in the long run (Straubhaar and Wolburg 1999; Wallace and Vincent 2007), which is expected to promote temporary mobility rather than permanent emigration as well. Finally, current return migration policies of sending countries with the aim of creating appropriate employment possibilities for highly skilled migrants also encourage the mainly temporary migration of highly skilled migrants in general and of scientists in particular (Laczko 2001).

The concept of brain circulation (Saxenian 2002; Barre et al. 2003; Kuznetsov 2006) indicates the relevance of transnational network ties in encouraging the structural interconnection and economic exchange between the economies of migration-sending and migration-receiving countries. In this context, transnational linkages of highly skilled professionals are understood to be both a competitive advantage in establishing high-tech businesses and a resource to increase the economic growth of both countries. In general, studies on brain circulation between Eastern and Western European countries focus mainly on the economic dimension of inequality and the fact that economic divergence between sending and receiving states is reduced due to transnational linkages among highly skilled professionals and among companies which operate across borders. In doing so, they rarely address factors which determine the stratification of access of highly skilled professionals to the symbolic and organizational resources in the context of cross-border migration.

Despite their conflicting views on the impact of international migration on economic disparities between the sending and receiving countries, the brain drain and brain circulation approaches have similar weaknesses. First, they tend to reduce social inequality to economic inequalities between nation-states. Second, they extrapolate the research results for the meso-level of organizations or networks to the macro-level, in this case the nation-states. Third, although the two approaches address the global and transnational settings of inequality formation, they focus primarily on nation-states as the units of analysis.

These approaches to the migration of scientists fail to consider three factors. In the first place, they do not acknowledge the multi-dimensional understanding of social inequalities proposed by intersectional studies (e.g., Anthias 2001; Walby, Armstrong and Strid 2012), most of which avoid reducing social inequality to economic inequality. In the second place, they ignore the current approaches to the transnationalization of social inequalities (e.g., Beck 2007; Faist 2009), which urge researchers to overcome the limitations of those approaches to social inequality analysis which focus exclusively on the unit of the nation-state. In the third place, they fail to consider the impacts of scientists' migration on the (re)structuring of the non-national scientific field. To address this particular factor, the next

section discusses the formation of scientists' unequal social positions within the scientific field using the transnational and field approaches.

Cross-Border Migration and the Hierarchy of Scientists' Positions: Towards the Transnational Field Approach

The transnational perspective allows researchers to study social inequalities in two ways. The first approach addresses the structural conditions which determine the positions of individuals or collectives within the transnational class hierarchy (Sklair 2001; Anderson 2000; Hochschild, 2000). The second approach focuses on the inequality of individuals' positions within the transnational social fields (Levitt and Glick Schiller 2004).

This study builds on the second approach because it allows us to consider the internal logic of science as a particular social field, using the field-specific hierarchies within transnational science to examine inequality between scientists' positions rather than the vertical inequality of social positions preferred by the transnational class approach. Moreover, the field perspective can be combined with the notion of multi-dimensionality of social inequalities more easily, as will be discussed later.

Pluri-Locality of Professional Commitments as a Constitutive Element of the Transnational Field of Science

According to the field approach, science is organized around practices of truth and knowledge production. It is internally divided into sub-fields of disciplines and into various disciplinary approaches and schools which govern the everyday practices and experiences of scientists. Inequality within this field thus emerges with respect to field-specific symbolic and organizational resources, such as symbolic power and access to positions in scientific organizations (Bourdieu 2001). The following section discusses the transnational dimension of the field of science and then examines the unequal distribution of these resources in detail.

The interview with Oleg previously mentioned suggests that pluri-local professional involvement is decisive for the constitution of the transnational field of science. According to Levitt and Glick Schiller (2004), who explicitly draw on Bourdieu's field theory, the ability of individuals, organizations and institutions to participate in multiply located, dense, long-term social networks that spread over nation-states, cities and localities is crucial for the formation of cross-border fields. This implies that it is not only mobile scientists who are defined as relevant field players, but also immobile scientists "who do not move themselves but maintain social relations across borders through various forms of communication" (Levitt and Glick Schiller 2004: 10).

According to this view, the *transnational scientific field* is organized around pluri-local professional linkages that are based on a network of social relationships which emerge from multiple memberships of scientists in universities or institutes in sending, receiving or even third countries. Mobile and immobile actors who are unable to get access to interpersonal and organizational transnational networks are excluded and predestined to remain players in national scientific landscapes. Transnational geographical mobility, which is characterized by an unfinished and multi-directional nature, appears to be a constitutive element of transnationalization.

The summary of Oleg's scientific career indicates three structural dimensions of transnationalization within the transnational field of science. The first dimension concerns ways of accessing the transnational field. The *interpersonal networks* allowed Oleg not only to begin his PhD studies in the receiving country, but also to maintain his professional contacts to the sending country. (These networks are gendered and ethnicized, as will be discussed in the next section).

The second dimension worth noting is *transnational membership* in scientific organizations such as universities. Scientists who enjoy transnational membership hold temporary or permanent teaching and/or research positions in the sending country and the receiving countries. Under certain circumstances, holders of transnational membership also have privileged access to the symbolic power and the institutional and material resources in various organizations of a scientific field.

Third, the *institutional level* of the scientific field makes *international visibility* of research one of the leading criteria for a distinguished scientific reputation. Transnational scientific reputation is reflected in the pressure exerted on scientists to produce a great number of peer-reviewed publications in national and international journals. The only way for researchers to build a transnational reputation is to have their research results recognized by relevant communities of academic disciplines both in and outside their home country. Recognition can come in various forms, such as honorary degrees and visiting professorships.

This author's ongoing research suggests that these three aspects are essential parts of the process of transnationalization of science. However, the transnational prospect taken does not suggest a transnational scientific landscape as based on mutual solidarity and equal opportunities in the scientific careers of transnational players. The following section draws on Bourdieu's field approach to address the issue of inequality of scientists' positions in more detail.

Understanding Inequalities within the Transnational Field of Science: Combining Bourdieu and the Intersectional Approach

How does the field approach address social inequality in the scientific sphere? Pierre Bourdieu's theory of social fields provides evidence of how social relations are fixed by power. He distinguishes between the economic, cultural, political, scientific and bureaucratic fields and assigns to each of them a specific logic (the *nomos*), insisting that the particular field logic organizes the routines to manage practices and experiences within the field (Bourdieu 1985)⁴. Although Bourdieu's field theory is used here heuristically, this article follows the understanding of the social field as created by the relational positions of actors who are involved in the fight over power of definition and symbolic resources. In this context, social inequality is defined as the inequality of social positions within a particular field that results from the specific rules of the field and the actors' access to the field-specific resources (Bourdieu 1985). However, the transnational perspective suggests that access to demanded resources and scientific reputation is evaluated against the background of the transnational landscape of scientific organizations. Because this study analyzes inequality as inequality between prominent scientists, holders of symbolic power and newcomers by whom these positions are formed, the principal concern of this article is the question of whether and under what conditions transnational linkages contribute to scientists' access to symbolic power within this specific field.

Although Bourdieu's field approach provides insights into how social inequality emerges within a particular field, it also acknowledges the relevance of multiple forms of capital, such as economic, cultural and social capital, which co-determine actors' social mobility (although they are somewhat less relevant than the field-specific capital most prevalent in the particular field structure).

However, apart from the capital (i.e. the class dimension), the field approach rarely considers the dimensions of ethnicity (including 'race') and gender. By ignoring these dimensions we risk overlooking dominant stratifying forces within the transnational field in question. The biographical account of Oleg suggests that the transnational positioning of scientists is characterized by a specific ambivalence. On the one hand, some of the interviewees mentioned "exploitation" at the universities of the sending country, which appeared to be connected with processes of (self-)ethnicization. This suggests that *ethnic categorizations* might become highly relevant stratifying forces in cross-border science.

On the other hand, the open coding of interview transcripts (Strauss 1987) indicates that gendered categorizations are relevant as well. For example, some interviewees believe that

⁴ The relation between particular fields is hierarchical. The fields are subordinated to the larger field of power relations.

the fact that there are only a small number of female transnational scientists is explained by “women’s natural ability to have and rear children, which potentially makes female scientists immobile”. Consequently, scholars benefit from addressing gendered categorizations as relevant for the genesis of unequal social positions in cross-border settings. The combination of the field theory and the intersectional lens to the inequality analysis is, therefore, a promising conceptual tool to reconstruct the unequal social positions within a cross-border setting.

Preliminary Results – Approaching Inequality of Social Positions within the Transnational Scientific Field: Towards the Power of Categorization

The preliminary results of this ongoing study are interpreted from the intersectional perspective on social inequality (Anthias 2011; Walby, Armstrong and Strid 2012).

First, this perspective considers various social categories such as class, gender and ethnicity/race as central principles to determine unequal life-chances and life-conditions. These different sets of unequal social relations cannot be reduced to each other, which means, for example, that gender or ethnic divisions cannot be reduced to class inequalities.

Second, this theory draws on post-structuralist ideas (Butler 1991; West and Zimmermann 2002) to highlight the *power of social categorization* spread over different social fields, institutional regimes or organizations. This approach analyzes the genesis of multi-dimensional hierarchies by identifying the *making* of social boundaries between ethnicities, gender positions or classes.

Third, in addition to focusing on the multi-dimensionally formed hierarchies within society, the intersectional analysis can also be used to address internal hierarchies within social fields. The following are a few paradigmatic examples of how ethnicity-, gender- and class-specific categorizations co-produce the unequal positions within the cross-border scientific field and of how they are connected to the unequal distribution of field-specific resources.

(1) Inequality of What?

The guiding question of this analysis is: What categories and what mechanisms produce unequal positions within the transnational scientific field? The focus is on positions and field-specific mobility between scientists who commute between Ukraine and Germany.

Which social practices are relevant for the formation of the advantaged and disadvantaged positions? This study argues that access to the transnational field of science and its internal

hierarchy is co-determined by multiple intersections of a) ethnicity-related, b) class-related and c) gender-related categorizations. The common characteristic of these different processes is that they stratify populations by the discursive process of naming or labelling. However, the specific inequality mechanisms are embedded in a pluri-local transnational setting which stretches between Germany and Ukraine. They include:

- Pluri-local ethnicization,
- Exploitation (in particular, in the immigration context),
- Pluri-local opportunity hoarding,
- Pluri-local engendering.

These categorical mechanisms are discussed in some detail in the following pages.

(2) ‘Highly Welcome Talents’, ‘Cheap Labour’ and ‘Patriots’: Natural Scientists between Ethnicization and Self-Ethnicization

Ethnicization, as a boundary between ‘us’ and ‘them’ (Wimmer 2008), is relevant in scientific organizations of both immigration and emigration countries, if in a different way. At universities in Germany, natural scientists from Ukraine are confronted with ambivalent ethnic labelling. First, they are ethnically labelled in a positive way as ‘highly welcome talents’, the main reason being that the educational institutions from which scientists originate in the emigration country enjoy a good scientific reputation in Germany (as well as in other European countries and the US). Most of the individuals interviewed for this study mentioned particular schools of mathematics and physics. Affiliation with these institutions opens doors to employment at universities in Germany and other countries.

However, Eastern European scientists also feel that they are regarded as cheap labour:

“I think that you know perfectly well what happened after the breakdown of the Soviet Union. All mathematicians went to the West. (...) Take a look at the publication lists of German scientists and at how they have changed since the 1990s. You will notice that German mathematicians really benefit from us: the frequency of their publications increased enormously. (...) Also look at the names: you will find Slavic-sounding names in all co-authored publications” (Source: Own research 2010–12, interview transcript 493: lines 7–12, 30-year-old researcher, mathematician, place of interview: Germany)⁵.

The interviewees also state that their employers expected them to perform additional duties not defined in their employment agreements. For example, all the interviewees were involved in the preparation of research proposals for their employers, an activity not specified in their

⁵ All interviews were conducted in Russian and translated by the author

contracts. However, they emphasized that this extra work was important because it gave them the opportunity to demonstrate ‘commitment’ and ‘willingness to get ahead’. Young scientists in particular justified this extra work as an opportunity to show that they are strong enough to pursue a scientific career in the West. Interestingly, all of the interviewees used ethnic categorizations to justify the extra work (or, to use Marxist terms, exploitation):

“We Ukrainians, no, (...) even more generally, (...) we Eastern Europeans are expected to work twice as hard (...) no, three, four times as hard as the natives. Who are we? NO-BO-DY (...) They [the employers, A. A.] make us feel that way every day. The only way to earn some respect is to work more: to publish, to speak at conferences and to obtain external funds. (...) But you also know, we are tough (...) compared to what WE experienced in the '90s, we will manage somehow” (Source: Own research 2010–12, interview transcript 501: lines 3–9, 28-year-old researcher, mathematician, place of interview: Germany).

This passage indicates not only how mobile scientists at German universities are ethnicized, but also how scientists ethnicize themselves: ‘Being strong enough’ is a (socially constructed) ethnic trait which is perceived as a condition for successful performance at universities in Germany and other countries. In addition, ‘being strong enough’ is related to the difficult shared past. Interestingly, ‘being a Ukrainian’ appears to be less relevant in this regard than the shared experience of being Eastern Europeans after the dramatic breakdown of socialism.

Mobile scientists are also affected by ethnic labelling at the scientific organizations of the sending country, since they commute between Ukraine and Germany. Universities in Ukraine benefit from the scientific know-how and international contacts of transnational scientists, as the following passage shows:

“When I found a position at this laboratory in Kiev, I was highly welcome because I knew the particular brain cell modification method of [names the method, A.A.]. Actually, I originally co-developed this method with my boss in Stuttgart. I also continued to publish with him on this topic. (...) However, my new boss [at a laboratory in Kiev] suddenly decided to be the co-author. What does that mean? She certainly benefited from the new international reputation I helped her build. (...) But this is why she also pushes my career ahead” (Source: Own research 2010–12, interview transcript 444: lines 13–19, 34-year-old researcher, cell biologist, place of interview: Kiev).

In addition, transnational scientists are positively labelled as ‘some of us’ or ‘our best’ for being able to get access to new audiences and communities:

“How am I welcomed in Kiev? That’s great! [laughs] My students there often say I am their idol” (Source: Own research 2009–12, interview transcript 503: line 10, 28-year-old researcher, mathematician, place of interview: Kiev)

Another interviewee expressed a similar view:

“What happens during my stays in Kiev [at the laboratory]? Actually, I feel like a ruler: everybody listens to me and (...) I enjoy a great reputation” (Source: Own research 2009–12, interview transcript 445: lines 8–9, 34-year-old researcher, cell biologist, place of interview: Kiev).

At Ukrainian universities, transnational scientists ethnicize themselves as part of the national scientific community. In particular, the contentious nation-building processes after the breakdown of the Soviet Union have promoted patriotic terms and definitions in the scientific-political discourse in Ukraine as well (Gnatyuk 2005). This is also a reason why the Ukrainian ministry of education and science regards scientific publications in Ukrainian as more relevant than publications in English when appointing professorships and other scientific positions. ‘Being a patriot’ is therefore an important issue within the scientific-political discourse in Ukraine because it has considerable influence on whether or not researchers can become members of scientific organizations. According to the interviewees, during their stays at the Ukrainian universities they usually use patriotic terms publicly to acknowledge their affiliation to the home institutes.

The preliminary conclusion is that, as evidenced above, the complex process of ethnicization is highly relevant for mobile scientists’ simultaneous access to and maintenance of membership in the universities of the sending and receiving countries. One could even use the term *paradoxical ethnicization* because the simultaneously occurring processes of self-ethnicization and ethnicization by others in this pluri-local setting appear to be rather ambiguous. Paradoxical ethnicization in particular could be identified as a social repertoire which encourages not only scientists’ transnational memberships but also the accumulation of scientific reputation reflected by a large number of publications in international peer-reviewed journals and international awards, among other things. The term ‘transnational membership’ refers to scientists’ simultaneous affiliations with two or more universities, which may involve different kinds of short-term and long-term employment or collaboration.

The question of how these ethnic categorizations are embedded in class-specific categorizations is addressed in the next section.

(3) Class-Related Categorizations: The Consciousness of ‘Being the Exploited Elite’

One of the first results of this study suggests that class-related categorizations are embedded in ethnic categories and, thus, in the process of (self-)ethnicization. At first glance, one may think of transnational scientists as the ‘transnational middle class’, a group of

people whose academic degrees are readily accepted in different nation-state contexts. However, the interviews suggest that these positions are more likely to intersect with ethnic categorizations. While Ukrainian scientists at the universities of the receiving country are perceived as lower middle class because of their ethnic background ('cheap labour'), their colleagues at the universities of the sending countries honour their international employment status in a country of higher economic development, thereby actually assigning a higher class position to them ('the best of us'). From the latter perspective, mobile scientists appear to be upwardly mobile because they have a higher income than immobile scientists in the sending country and "enjoy cosmopolitan lifestyles", which include international collaboration, participation in international conferences and international travel. This perception also results from objectified differences in living expenses and wage levels between the two counties⁶. To use a Marxist term, the 'consciousness' of my interviewees is that of a 'disadvantaged elite'. Mobile scientists are well aware of the extra work they are expected to put in outside the Ukraine, but they also regard employment abroad as an opportunity to pursue an international career. Paradoxically, this consciousness of 'being privileged' is not addressed or discussed by them as a contradiction in terms⁷.

(2) Why Are Female Natural Scientists at a Disadvantage? Between 'Post-Socialist' and 'Western' Interpretations of Feminism

The research conducted for this study suggests that female mobile scientists in particular face considerable challenges in pursuing international scientific careers and that these challenges are significantly different from those facing male scientists.

Engendering, as a social boundary between 'male' and 'female' practices in the scientific field, is both discipline-specific and context-specific (depending on the types of networks and organizations in which the scientists are involved). Scientific organizations in Western and Eastern European countries have been making efforts to achieve gender equality, but this trend is framed by different institutional discourses and strategies of legitimization. At German universities the gender equality discourse (which includes a discourse on the strategy of 'gender mainstreaming') began in the early 1970s and was institutionalized by the end of 1980. Socialist feminism, which was part of the official Soviet ideology, became relevant in scientific organizations of the UdSSR much earlier, in the 1930s.

⁶ The average monthly income in Ukraine is around €250.

⁷ Similar results are reported by Katarzyna Wolanik Boström & Magnus Öhlander, who researched carrier trajectories of Polish doctors in Sweden (2012).

The main idea of 'socialist feminism' involved gender equality in terms of income and access to professional positions and decision-making processes (Dudwick, Srinivasan and Braithwaite 2002). Soviet universities and research institutes in particular, including natural science institutes, followed this policy of gender equality until the end of the 1980s. The natural sciences were not completely dominated by female scientists in the USSR, but nor were they exclusively the domain of male researchers (Linkova 2007). For reasons of space, this article cannot discuss particular gender discourses and gender orders in greater detail. Instead, the intention is to emphasize the increasingly shared institutional semantics of gender equality in the universities of both countries.

An interesting finding here is that despite the formally institutionalized gender equality arrangements, there are, in particular, mobile female scientists who give up their international careers on the grounds that they are excluded from relevant resources.

One of the interviewees had successfully completed her PhD in Biology at a German university and had been employed at an innovative research project, but then decided to terminate her contract to return to Ukraine. She stated that Kiev was the more favourable environment to make care arrangements after the birth of her child. Although she continued to work at a research institute in Kiev, she did not have the same access to funding and technologies. As a result, she was unable to submit publications with innovative research results to internationally renowned journals. Indeed, this interviewee explicitly reflected on this downward mobility, stating that the loss of professional opportunities was strongly connected to particular stages in the life of a female researcher such as pregnancy and child birth. The interviewee also remembered very well what happened when she told her German employer about her decision to leave the job:

"This happened during the mandatory Christmas party at our office [at a German university, A. A.]. When my boss, (...) you know, she is a successful female professor (...) opened the party, she said to everybody, 'Look at her! She got pregnant and now she's leaving us! What better way to ruin a scientific career!' (...) Later, however, she apologized, though not in public, not in front of the others" (Source: Own research 2010–12, interview transcript 221: lines 9–14, 28-year-old researcher, cell biologist, place of interview: Kiev)

This account is important because balancing motherhood and a scientific career is not a contradiction in terms, according to socialist feminist ideology, which is still quite a powerful tradition in post-socialist Ukraine. The gender equality discourse in Germany and other non-socialist countries, by contrast, places great emphasis on equal professional opportunities, but still rarely treats the balancing of parenthood and a successful professional career as something to be taken for granted (Pfau-Effinger and Magdalenic 2009).

A similar account was given by another female interviewee, a mathematician, who justified her decision to leave her postdoctoral work and continue her career in a lower position as a lecturer (although without going back to the Ukraine), stating that she had to take care of her baby. It is worth mentioning that the husbands of the two female scientists, who are mobile themselves, have been successfully continuing their research.

The process of social categorization, which relates to biological differences (pregnancy, child birth), creates a categorical distinction between 'male' and 'female' that is still relevant in contexts of scientific organizations. The interesting finding is that transnational scientists organize their careers at the crossroads of multiple national and institutional gender orders of the scientific field. However, the post-socialist gendered career pattern (the balancing of parenthood and professional activities) is in conflict with the non-socialist feminist discourse and results in the exclusion of female mobile researchers from career opportunities.

On Mechanisms of Inequality Formation in Cross-Border Science: Exploitation and Opportunity Hoarding in a Pluri-Local Setting

The preliminary results of this ongoing study suggest that neither the brain drain approach nor the brain circulation theory explain the genesis of transnational inequalities because their main interest is the economically quantifiable advancement of particular nation-states which are connected by migration flows. This is why these approaches examine scientists' geographical mobility in the context of migration of highly skilled professionals who are expected to contribute to economic and other types of progress.

However, this article suggests that migration scholars look beyond exclusive frameworks of particular nation-states. It also casts doubt on the traditional view that social inequality always results from economic inequality between nation-states, or that it is a class order within particular national societies.

This study draws on the transnational field approach (Levitt and Glick Schiller 2004), the theory of science as a social field (Bourdieu 2001) and the intersectional lens (Walby, Armstrong and Strid 2012) to explain how the genesis of unequal social positions can be re-conceptualized within transnational frameworks.

In the context of cross-border science, social inequality is thus understood as inequality in scientific reputation in the sense of a field-specific resource which implies access to publication opportunities, research funding and positions in organizations. The hierarchy within cross-border science, as shown in the example of mobile natural scientists, is conceptualized as a continuum of social positions which is reflected in scientists' degree of

ability to accumulate *multiple memberships in and affiliations to* scientific organizations in different national landscapes.

In addition, it has been argued that access to these positions is grounded in and influenced by *social practices of categorization*, which include ethnicity-related, class-related and gender-related systems of classification. However, these specific categorizations are not just powerful in fixed national settings, but also bring about an ambivalent power and rather contradictory positions in a pluri-locally organized transnational setting.

For example, the ethnicization of mobile scientists from Ukraine as ‘cheap labour’ encourages their (self-)exploitation in the receiving setting. At the same time, affiliation to German universities is perceived as an important condition for the accumulation of transnational memberships and, therefore, progress in reputation-building. But mobile scientists also enjoy privileges at organizations in the sending country (Ukraine), so what is considered as exploitation on the basis of ethnic belonging in Germany is considered as an honour in the Ukraine.

Thus, it appears that exploitation and extra work are connected to the mechanism of pluri-locally organized opportunity hoarding (Tilly 2000). This is reflected in the fact that at the receiving universities transnational scientists act (and present themselves) as ‘bridging brokers’, that is, professionals who provide and maintain contacts to national scientific communities in the sending country. Mobile scientists are simultaneously able to accumulate opportunities at the Ukrainian universities, where they act as a ‘strategic group’ which is able to provide access to the latest international scientific subjects, methods and international networks. (Male) mobile scientists use the mechanism of opportunity hoarding to reach the top of the transnational hierarchy, thus gaining access to symbolic power (Bourdieu 1985) in various institutional settings.

This process of hierarchization is also highly gendered. The conflict between post-socialist feminism and “Western” feminism has an effect on the day-to-day operations of laboratories as well as on biographical decisions, which result in the exclusion of female mobile scientists from access to relevant resources and move them to the bottom of the cross-border hierarchy.

This process of hierarchization, its multi-dimensionality and its contradictions could not have been examined without the transnational perspective, which has identified cross-border mobility as crucial for the transformation of social orders. As the study of cross-border mobility of natural scientists between Germany and Ukraine has shown, this perspective provides worthwhile avenues for future research on cross-border inequality patterns.

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